PART XII.

GRAVID UTERUS, AND LYMPHATICS.

SYSTEM

OF

ANATOMICAL PLATES;

ACCOMPANIED WITH DESCRIPTIONS,

AND

PHYSIOLOGICAL, PATHOLOGICAL, AND SURGICAL

OBSERVATIONS.

BY

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PART XII.—GRAVID UTERUS, AND LYMPHATICS.

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GRAVID UTERUS.

THE description of the uterus in the gravid or impregnated state naturally follows that of the organ in the virgin state, and I shall therefore proceed to describe the gravid uterus at the ninth month, or full period of utero-gestation, and afterwards the fetus at the same age.

At the ninth month of utero-gestation, as represented by Plates VII. and VIII., the uterus K has risen out of the pelvic cavity, and rests on the pubes A; has elevated the floating viscera, particularly the jejunum and ileum L, near the diaphragm, and even raised the liver and spleen a little atlantad, so that all of them press on this muscular partition, and reduce the cavity of the thorax. The jejunum and ileum are also pressed laterad of the uterus. The anterior parietes of the uterus K, are in immediate contact with the peritoneum *a*, investing the anterior and lateral parietes of the abdominal cavity.* The uterus

* The close connexion of the anterior parietes of the abdomen with the uterus should be kept in view in the cæsarian operation. At the sixth month the small intestines have been found between the interior parietes and the uterus, but never at the ninth month.

has by this time acquired a great magnitude, is entirely changed in its shape and appearance, being of an oval figure; its cervix E is now obliterated by the distension; and its fleshy parietes are considerably increased in thickness, as represented in Plate VIII., the section being marked *b*. The Fallopian tubes *k**, have also become shorter, thicker, and more fleshy; the peritoneum has increased with the uterus, and, in only very few instances, has been found elongated and somewhat thinner than elsewhere; the spermatic and uterine arteries, with their corresponding veins, are enormously enlarged; the hypogastric plexus, and the abdominal muscular twigs of the lumbar nerves, are augmented; and the lymphatics are likewise increased greatly in magnitude.

On making a section of the parietes of the uterus, as exemplified in Plate VIII., we perceive them, (marked with the letters *b*,) remarkably thick and fleshy, and interspersed with numerous large foramina, which are the bisected blood-vessels, now enormously enlarged; we observe them invested with three membrânes, marked *f*, *d*, *c*; and interior to the last, the fetus and placenta *p*, with their medium of connexion, the umbilical cord, marked *n*, *n*, g. The membranes * are the decidua *f*, the chorion *d*, and the amnion *c*.

The decidua, † marked *f* in Plate VIII., and in *Figs.* 1 and 9 of Plate IX., invests the inner or concave surface of the uterus *b*, and the outer or convex surface of the chorion *d*, forming a complete sac, somewhat similar to the peritoneum, excepting at the os uteri, where the uterine lamina does not extend across this aperture, but

* Syn. Secundæ Secundines: Involucra: Membranæ: Les enveloppes: Délivre.

† Syn. Membrana caduca: Tunica exterior ovi: Membrana Hunteri: Membrana cribrosa: Epichorion.

here ceases, the os uteri being shut up by a gelatinous substance. These two laminæ unite round the margin of the placenta *p*. That portion investing the uterus, is named the decidua externa or vera; while that which invests the chorion, is called the decidua interna or reflexa.* The surfaces of these laminæ, looking to each other, are serous, whereas the surfaces which adhere to the uterus and to the chorion, may be said to be cellular. That portion adhering to the uterus has a number of flocculent processes, which seem to be the blood-vessels that supply it, being derived from the uterine vessels, and entering this membrane in an oblique direction, running in beautiful serpentine convolutions; while that which adheres to the chorion requires some degree of putrefaction in order to separate it. The decidua is of yellowish colour, resembling coagulable lymph, is soft and spongy, having in some places a cribriform appearance, particularly where it invests the chorion opposite the os uteri.

The chorion,† marked *d* in Plate VIII., and in *Figs.* 1, 2, 3, 4, 7, 8, and 9, of Plate IX., is situated immediately internal or central to the decidua *f*, which it invests, and exterior or peripheral to the amnion *c*, to which it also adheres. It is a thin pellucid membrane, having delicate villous prolongations on its two surfaces, especially on the outer, as represented in *Fig.* 8 of Plate IX., which are blood-vessels derived from the umbilical vessels. Where it invests the placenta, it is thicker, affording a coating to its blood-vessels, and extends along the umbilical cord, onwards to the fetus, where it is lost in the integuments. Some authors describe the chorion to consist of two laminæ, between which run small blood-vessels.

* Syn. Chorion fungosum.

† Syn. Chorion pellucidum; Membrana vasculosa; Membrana extima.

The amnion,* marked *c* in Plate VIII., and in *Figs.* 1, 2, 4, and 9, of Plate IX., is situated immediately within or centrad of the chorion *d*, to which it adheres by delicate gelatinous substance, analogous to cellular tissue, and at the placenta it extends along the umbilical cord onwards to the fetus, where it blends with the integuments, particularly the epidermis. It is a thin transparent membrane, but tougher in its texture than either the chorion or decidua, and has an internal serous surface towards the fetus.

Within the amnion, is contained a clear limpid fluid, named the liquor amnii, which is generally about eight ounces in quantity at parturition, and is then more or less muddy and flocculent. Its situation may be comprehended by examining *Figs.* 7 and 9 of Plate IX., where, in the latter, the decidua *f* and chorion *d* are laid open, and the amnion *c* containing its liquid left entire; while in *Fig.* 7 both amnion and chorion *d* are left sound.†

The placenta, marked with the letters *p* in Plate VIII., and in *Figs.* 1 and 9 of Plate IX., is situated generally at the superior and posterior part of the fundus of the uterus, a little towards the right side, adhering to the inner surface of the uterus through the medium of the decidua.‡

In *Fig.* 1 of Plate IX., which is a view of this body the full size of life, we observe that it is a soft flat mass, of

* Syn. Tunica ovi intima: Amnios.

† The amnion is occasionally separated from the chorion in the early months of gestation, by a deposition of fluid, which is named the false water of the amnion. This, however, generally disappears between the second and third month.

‡ The placenta sometimes adheres to the uterus so near the cervix, as to impede the advancement of the fetus at birth, and produce hemorrhage, which may prove fatal both to the mother and fetus.

a roundish oval figure,* about eight inches in length, and from six to seven in breadth, and one in thickness, being thickest in its centre, and becoming gradually thinner towards its circumference; it is invested on this surface, which looks to the fetus, with the amnion, chorion, and decidua; and on its uterine surface, simply with the latter. On the uterine aspect, however, it is rough and irregular, from the decidua being generally detached at parturition. It consists of a profusion of blood-vessels, the divisions of the two umbilical arteries *n*, *n*, and the umbilical vein g, distributed in a delicate parenchymatous substance, which is subdivided by productions of the decidua from both surfaces, so as to give it a lobulated appearance; each tissue of veins and arteries forming a lobulus,† the veins being much more numerous than the arteries. These lobules, of an irregular round shape, are very distinct on its uterine aspect, and vary very much in size. Besides the decidua on its uterine surface, there is another soft stratum, termed the parenchymatous substance, resembling it very much, which is situated between the decidua and these lobules, and which extends from lobule to lobule, and penetrates between them. By some authors the placenta is divided into a uterine and fetal portion, with the intervention of a cellular structure, like that of the corpora cavernosa penis; but this is evidently incorrect, for, not until the mass is very putrid, can we in the least separate it into two portions; and, as even Dr. Hunter himself observes, "In a placenta of nine months, I have never been able to separate the two constituent parts otherwise than by some degree of putrefac-

* The placenta is sometimes very oblong, and at others triangular, and even very irregular, being like two united by an isthmus, or having one or two small lobes appended to it.

† Syn. Cotyledone: Lobe.

tion, and gentle rubbing and washing; but this operation always destroys the uterine portion, which is more tender, and melts down by putrefaction sooner than the other."

From experiments lately performed by Dr. Lauth,* vessels have been discovered between the interior surface of the uterus and the decidua, which he considers to be lymphatic. "On examining with care," says he, "a placenta still covered by the deciduous membrane, it will be seen that these two parts are united with each other, by a multitude of small transparent vessels which proceed from the one towards the other. These vessels can be injected neither by those of the placenta, nor by those of the membrana decidua; but a very fine tube inserted into either, allows at one time the vessels of the decidua, at another those of the placenta, to be injected. From this it follows, 1*st*, That the vessels are of two orders, the one belonging to the decidua, and consequently to the uterus, and the other to the placenta; 2*dly*, That these are not blood-vessels; and, 3*dly*, That these terminate, the one in the blood-vessels of the membrana decidua, and the other in those of the placenta, by orifices provided with valves, which impede their being injected from behind."† It is probable, from the observations of Uttini, ‡ Michaelis, § and Lauth, that lymphatics exist in the placenta.

The umbilical cord,|| marked g, *n*, *n*, in Plate VIII.,

* Repertoire d'Anatomie et de Physiologie Pathologiques.

† The decidua which invests the uterine surface of the placenta, and the umbilical arteries in its neighbourhood, frequently becomes cartilaginous, or has calcareous depositions in it at parturition; the placenta also becomes occasionally scirrhous, points of consideration for the accoucheur; and hydatiform vesicles are occasionally found throughout the substance of the placenta.

‡ Uttini Memoria dell Instituto Nationale Italiano.

§ Michaelis Observat. circa placentæ ac funiculi umbilici vasa absorbentia.

|| Syn. Funis vel funiculus umbilicalis.

and in *Fig.* 1 of Plate IX., is situated within the amnion a, floating in its liquid, and extends generally from near the centre* of the placenta *p* to the umbilicus of the fetus, twining round the neck of the latter, and varying from fifteen to twenty-four inches in length.† It consists of the two umbilical arteries *n*, *n*, and the umbilical vein g, beautifully entwining around each other, and invested with the amnion‡ and chorion, which are here transparent and gelatinous. Beneath the chorion and amnion there is a still greater quantity of this gelatinous substance,§ varying very much in quantity in different individuals. The umbilical vein, g, begins by small branches in the placenta, which communicate with the vascular system of the mother, by means of lymphatics, as explained in page 6, and probably also by venous absorption, through the medium of the multiplied radicles of the veins; these veins progressively become larger, unite freely with each other, and ultimately congregate to form that marked g, which proceeds along the umbilical cord, generally in its centre, the arteries twining round it,‖

* Great irregularity exists in the point of origin of the umbilical cord from the placenta; sometimes it originates precisely in the centre, but more commonly a little to the one side, sometimes at the very edge, at other times at the one end, and at others, again, not for some distance from the edge—the vessels, in this latter case, not having concentrated to form the cord, until they have run along the convex aspect of the membranes between the decidua and the chorion. In these cases the vessels form several centres.

† The umbilical cord is subject to great irregularity in its course about the fetus, and hence the circulation is frequently stopt for such a length of time, during parturition, as to prove fatal to the fetus. The funis is also occasionally twisted so as to form a perfect knot, which likewise sometimes proves fatal to the fetus during parturition. It likewise varies very much in its length, and frequently has nodosities here and there.

‡ Syn. Vagina umbilicalis.

§ Syn. Gelatina Whartoniana.

‖ The vein sometimes encircles the arteries, and sometimes the three vessels encircle one another.

to the umbilicus of the fetus, where it enters and proceeds between the anterior muscles of the abdomen, in the line of the linea alba, and in the duplicature of the peritoneum which forms the suspensory ligament of the liver, to the umbilical fissure, where it divides into several branches, from fifteen to twenty in number, one of which runs downwards in the fissure to join the vena cava ascendens *i*, as delineated in *Fig.* 6 of Plate II. of Part II., and is named ductus venosus;* the other branches enter the liver, with the exception of one that joins the vena portæ. No valves exist in the course of the umbilical vein, but one is found where it divides at the liver of the fetus, and another where the ductus venosus joins the vena cava. No inosculation takes place between the umbilical vein and the arteries in their progress along the cord. The smaller veins in the placenta intermingle with the arteries, the one crossing and encircling the other in a beautiful manner.

The umbilical arteries *n*, *n*, originate from the internal iliac arteries of the fetus, as represented in *Fig.* 6 of Plate II. of Part II., and described in page 35 of the same Part. They ascend behind the peritoneum, along the parietes of the pelvis, and the sides of the urinary bladder, to the anterior walls of the abdomen, where they still run peripheral or exterior to the peritoneum, atlantad or upwards to the umbilicus, at which aperture they emerge, and run along the umbilical cord, twining round the vein g, as delineated in Plate VIII., and in *Fig.* 1 of Plate IX. of Part XII., onwards to the placenta *p*, where they branch out into several vessels, many of them inosculating, and the ultimate divisions terminating in the commencements of the umbilical vein. These two umbilical arteries generally anastomose very freely just where they begin to branch out on the placenta.

* The ductus venosus sometimes joins the venæ hepaticæ.

According to the interesting investigations of that indefatigable philosopher Sir Everard Home,* nerves have been discovered supplying the placenta and umbilical cord. Those of the latter run in the gelatinous substance between the blood-vessels. They have been also seen by Chaussier and Ribes to proceed from the great intercostal nerve of the fetus, along the umbilical cord to the placenta.† Lymphatic vessels have been found on the umbilical cord by some anatomists, but they are denied by others.

I shall now proceed to describe the condition of the fetus at its full developement, or at the ninth month.

Its osseous, muscular, vascular, and nervous systems have been already described in the respective Parts wherein these subjects are treated of.

The umbilical aperture is merely a foramen in the linea alba, which becomes closed when respiration takes place at birth, throwing into action the abdominal muscles. The tendinous fibres, however, of the lateral muscles, especially those of the external oblique, cross each other around this aperture, as described in page 3 of Part IV., the more effectually to shut it up after birth.

The fetus, enveloped by the membranes, is situated in the uterus, being immediately surrounded by the amnion and its fluid; and in the last month of gestation, near the period of parturition, it has an oblique position, its back towards the left side of the mother, its head towards the os uteri, resting on the pubes, the chin touching the breast; its upper extremities also resting on the breast, and gently bent; its lower extremities gently bent, the patellar aspect of the thighs touching the abdomen, and

* Phil. Trans. for 1825, Part I.

† Experiences Nouvelles sur le Digestion, et Remarques à ce Sujet dâns Journ. Univ. des Sciences Med. t. i. p. 233.

the heels the popliteal aspect of the thighs, with its feet towards the placenta, and crossing each other in order to occupy the smallest possible space, and to conform to the shape of the uterus, being, like it, of an oval figure, as represented in Plate VIII. This is the natural position of the fetus immediately prior to parturition, but a great variety exists, constituting the many different cases of labour, as those of the face, breech, and foot.

It is commonly about twenty-two inches long, and weighs from eight to fifteen pounds. The skin is of a bluish violet colour, and covered with a white sebaceous substance, particularly the head, back, axillæ, and groins.

The thoracic cavity is much smaller, relatively speaking, than in the adult, in consequence of the lungs being collapsed; and the diaphragm is loose and flaccid. The thymus gland, a large glandular mass, consisting of two oblong lobes, united at their sacral aspect, but free at their atlantal aspects, where they extend on the sides of the trachea, is situated in the anterior cavity of the mediastinum, as described in page 11 of Part II., and extends also upwards or atlantad in the neck, towards the thyroid gland. It rests in some degree on the pericardium and large blood-vessels of the heart, and also on the left subclavian vein; it is of a whitish yellow colour, and consists of a number of small vesicles, containing a milky coloured fluid, surrounded and connected together with a tolerably thick and strong cellular tissue. A number of small blood-vessels are distributed to this gland, but no excretory ducts have been traced from it.

The lungs are collapsed and solid, and of a purplish colour, none of the blood in the fetus having been yet oxygenated. The foramen ovale exists in the septum auriculorum of the heart, as described in page 3 of Part II.; and, in page 5 of the same Part, the pulmonary

artery is described to have a central branch, named the ductus arteriosus, which extends to the arch of the aorta. The pulmonary veins are collapsed, and to appearance much smaller than natural.

The head bears a greater proportion to the rest of the fetus than in the adult.

The abdomen is also larger and more prominent in proportion, chiefly in consequence of the magnitude of the liver. The liver bears a considerably larger proportion to the other viscera than it does in the adult, and particularly the left lobe, which is even larger than the right, and extends into the left hypochondriac region; the free margin of the liver descending almost to the umbilicus. Its texture, which is of a deep red colour, is exceedingly soft and pulpy. In the earlier stage of the fetus, there is merely a mucous fluid found in the gall bladder, and not until a short period before birth is there any biliary fluid secreted. The course of the umbilical vein, and its branches which enter into the substance of the liver, have been described.

In the intestinal canal there is a peculiar glairy substance, of a greenish colour in the small, and blackish in the large intestines, which is termed meconium.* The supra-renal glands are considerably larger in the fetus than in the adult. The urinary bladder rises more into the abdominal cavity than in the adult, in consequence of the shallowness of the pelvis. The urachus is more conspicuous; and the umbilical arteries, as already described, are the largest branches of the internal iliacs. These are the chief peculiarities in the fetus at

* The colour of this substance should be attended to when operating on a child born with an imperforated anus.

the full period of gestation, the rest having been described in the different Parts on the other viscera of the adult.

My original intention was to describe the gradual changes which the uterus undergoes during gestation, and the progressive developement of the fetus; but I found that these so involved the physiology of generation, that it was impossible to give the one without the other. I shall therefore abandon describing these at present, as it will be much more satisfactory to give them under the physiology of generation.

LYMPHATIC,

OR

ABSORBENT SYSTEM.

The lymphatic system consists of an elaborate set of vessels, being more numerous than either the arterial or venous, and of a number of glands distributed in various parts in the course of these vessels.

The lymphatics consist of a superficial and a deep set of vessels, throughout not only the head and extremities, but even all the viscera of the thorax, abdomen, and pelvis. Some of them, almost as soon as they originate, at once join the veins in the capillary tissue, others join the veins in the lymphatic glands, while others again concentrate to form the thoracic duct, which ultimately also joins the venous system. Every venous or arterial

trunk is generally accompanied with several lymphatics, commonly ten in number; and all the lymphatic vessels have valves somewhat similar to those of the veins.

The lymphatics situated on the alimentary canal are named lacteals,* and both these and the other lymphatics are also termed absorbents.

The lacteals are those lymphatics or absorbents situated on the intestinal canal, being named so from the commencement of the duodenum to the termination of the rectum. But there are other absorbents which carry the lymph from the tissue of the intestines, and which are simply named lymphatics, although they take the same course. They are subdivided into lactea primi generis, and lactea secundi generis. The lactea primi generis are those which extend from the intestines to the lymphatic glands situated in the folds of the mesentery; and the lactea secundi generis are those which extend from the lymphatic glands to the thoracic duct.

In order to give a connected description, I shall begin with the lymphatics of the stomach. These arrange themselves into three fasciculi, those of the left side, those of the lesser curvature, and those of the greater arch. The lymphatics of the left side originate at the larger extremity or cul-de-sac of the stomach, where they are joined by some of those of the omentum majus, accompany the vasa brevia of the splenic artery to its trunk, where they terminate in the lymphatics of the spleen. The lymphatics of the right side or greater arch originate from this region of the stomach and the omentum majus, accompany the arteria gastro-epiploica dextra, running through several small lymphatic glands in their course, to the dorsal aspect of the pancreas, where they unite be-

* Syn. Vasa chylifera.

tween the cœliac and superior mesenteric arteries with the lacteals of the intestines, in order to form one of the principal branches of the thoracic duct. These lymphatics of the greater arch also inosculate in their course with those of the lesser arch. The lymphatics of the lesser arch originate near the pyloric orifice of the stomach, where they anastomose with those of the greater arch; accompany the gastric artery to the cardiac orifice, running through several lymphatic glands; and concentrating, they descend to the root of the liver, where they join the lymphatics of this organ, and terminate in the thoracic duct. These lymphatics of the stomach will be found chiefly to accompany the arteries of the stomach, and, before concentrating, to run both superficially and deep seated; the superficial arising between the peritoneal and muscular coats, and forming numerous inosculations; the deep seated originating between the muscular and villous tunics, and uniting with each other, and also with the superficial set. In this course, these lymphatics communicate or run through several lymphatic glands,* some of which are situated on the lesser concave arch in the course of the gastric artery, others on the greater convex arch in the course of the arteria gastro-epiploica dextra et sinistra, also in the course of the vasa brevia. These glands are small and few in number, being seldom more than five or six on each arch.

The lymphatics or lacteals of the small intestines are very numerous, more so than those of the stomach or the large intestines, and abound more in the duodenum than in the jejunum or ileum, and more in the jejunum than in the ileum. They consist of a superficial and deep seated set; the deep seated originating from the

* Syn. Glandulæ ventriculi superiores et inferiores: Glandulæ stomacho-epiploicæ; Les glandes gastro-epiploïques.

mucous coat, from the villi or radicles which absorb the chyle, described in page 23 of Part XI. They run between the mucous and muscular tunics, around the intestine in a circular manner, some of them piercing the muscular coat and uniting with the superficial set in this region, while others run between the peritoneal folds forming the mesentery, and there unite with the superficial. This latter set derive their origin between the muscular and peritoneal coats, where, as already observed, they form inosculations with the deep seated lacteals, and extend first in a longitudinal manner along the intestinal canal, as delineated in Plate X., marked with the digits 12, uniting with each other in various directions, and ultimately joining the deep seated set in the folds of the mesentery. The two sets unite and concentrate, and run in the course of the superior mesenteric artery, marked R in Plate X. of Part XII., piercing or communicating with the mesenteric glands, marked with the digits 3. In their course along the trunk of the superior mesenteric artery R, these are joined by the lymphatics of the ascending O, and transverse P, portions of the colon, marked with the digits 13, which vessels arise and run in a similar manner to those of the small intestines, being only much less numerous. The whole are now generally concentrated into two, three, or four vessels, which accompany the superior mesenteric artery to the pancreas, where they inosculate with the lymphatics of the pancreas, liver, and spleen, and form one of the chief branches constituting the thoracic duct, marked with the digit 1. The lymphatics of the sigmoid flexure Z of the colon, and the rectum I*, take a different course; those of the colon join the lymphatic glands in the sacral and lumbar regions, and those of the rectum, the lymphatics in the sacral and iliac regions, both of them ultimately terminat-

ing in the lymphatic trunks of the lower extremities which contribute to form the thoracic duct.

These lymphatic vessels, in their course from the small and large intestines, pass through or communicate with a number of lymphatic glands, which are named mesenteric and mesocolic, from their situation. The mesenteric, marked with the digits 3, are chiefly situated on the sinistral aspect of the superior mesenteric artery R, and are much more numerous and larger than the mesocolic, marked with the digits 2, being estimated by some authors to be upwards of a hundred in number. The glands communicating with the lymphatics of the jejunum K, are better developed than those of the ileum, and those near the intestine are smaller and more apart than those near the trunk of the artery.*

The lymphatics of the liver I, i, are extremely numerous, small, and have less perfect valves, so that they can be injected from their trunks, and arrange themselves into deep and superficial sets. The superficial set of lymphatics is distributed on the convex and concave aspects; those on the convex surface arrange themselves into three fasciculi, a right, a left, and a middle. The right fasciculus extends over the convex surface of the right lobe I, runs towards the right lateral ligament, where it pierces the diaphragm, and enters the thoracic cavity, some of the branches joining the thoracic duct 1, others inosculating with the inferior lymphatics of the diaphragm, while others again advance sternad to unite with the middle fasciculus after its entrance into the thorax. The left fasciculus occupies the greater extent of the convex surface of the left lobe i of the liver, runs towards the left lateral liga-

* The mesenteric lymphatic glands are subject to inflammation, suppuration, scrophulous enlargement, scirrhus, cancer, osseous concretions, earthy concretions, and the various species of sarcoma.

ment, and joins the lymphatics of the lesser concave arch of the stomach, as described in page 15. The middle fasciculus derives its origin partly from the left and partly from the right lobe of the liver, runs along the suspensory ligament, and pierces the diaphragm near the sternum: having entered the thoracic cavity, its vessels, about six in number, inosculate with the lymphatics in this region of the diaphragm, and concentrate in forming two or more trunks, which run in the folds of the mediastinum, uniting with the lymphatics of the pericardium and pleura sternalis, onwards to the thoracic duct near its termination. Sometimes a few vessels of this fasciculus run on the left of the suspensory ligament towards the coronary ligament, and join other lymphatics of the liver between the left lobe and diaphragm, which descend to the thoracic duct in the abdomen.

The superficial lymphatics on the concave surface of the liver, marked with the digits 14, in Plate X., are not so numerous as those on the convex aspect, with which they inosculate. They run along the concave surface i; those on the right lobe uniting with those on the left i, and also with the deep lymphatics towards the vena portæ, along which they extend and unite with the lymphatics of the intestines. Some of these latter lymphatics of the liver at once pierce the glandular substance and unite with the deep-seated set.

The deep-seated lymphatics of the liver, much more numerous than the superficial, accompany the divisions of the vena portæ, hepatic artery, and hepatic duct, and emerge at the fossa of the vena portæ, accompanying this vessel to the root of the mesentery, where they unite with the lymphatics of the intestines, to form one of the chief sources of the thoracic duct; and forming in this course inosculations with the lymphatics of the lesser arch of the

stomach, and those of the pancreas and spleen. These lymphatics pass through or communicate with several lymphatic glands situated in their course along the trunk of the vena portæ.*

The lymphatics of the spleen consist of a superficial and deep set, the former of which being very small, originating from, and encircling its convex surface, descend towards the entrance of the splenic artery, where they are joined by the deep-seated lymphatics of considerable magnitude, and from thence both proceed along and around the artery. In their progress along the splenic artery, they are joined by the superficial and deep-seated lymphatics of the pancreas, and then proceed to join the lymphatics of the intestines, inosculating with those of the stomach, as described in page 13.

The thoracic duct,† marked with the digit 1 in Plate XV. of Part X., and in Plate X. of Part XII., is formed by this concentration of the lymphatics of the stomach, intestines, liver, spleen, and pancreas, together with the two trunks of the lymphatics of the lower extremities and the other viscera of the abdomen and pelvis, and is generally first observable in the region of the first, second, or third lumbar vertebra, between the fleshy pillars of the diaphragm, dorsad of the aorta, and atlantad of the right renal artery. Here, or a little atlantad, it commonly becomes a little enlarged, and has been named the receptaculum chyli;‡ but more frequently there is merely a sort of varicose appearance. From this region the thoracic duct 1, ascends behind the aorta a little dextrad, and enters the thoracic cavity between the aorta

* These lymphatic glands are sometimes so tumefied, that they obstruct the course of the biliary fluid along the ducts, and produce icterus.

† Syn. Left thoracic canal: Le canal thoracique, proprement dit.

‡ Syn. Cysterna chyli: Reservoir of Pecquet: Saccus lacteus of Van Horne.

and the right crus of the diaphragm, then ascends in the posterior cavity of the mediastinum, between the aorta and vena azygos 5*, to the fifth dorsal vertebra, where it runs sinistrad obliquely behind or dorsad to the œsophagus I, the descending aorta E, and its arch, to the root or origin of the left carotid artery P, dorsad to which, and sinistrad of the œsophagus, it ascends to the second or first dorsal vertebra, where it mounts to the left internal jugular vein, forming a circular turn. Here it generally splits into two branches, which, after proceeding a very short distance, again unite and run dorsad to this vein to the sinistral aspect of its termination, where the duct joins the left subclavian vein, by entering its atlanto-dorsal or superior posterior aspect; the internal serous tunic of the vein forming a semilunar valve, which covers two-thirds of the orifice of the duct. In this course, the thoracic duct having few valves, occasionally divides and unites again more than once, particularly where it crosses from right to left in the thoracic cavity, and in this course it is also joined by several branches, the lymphatics of the pleura, intercostal spaces, and the lymphatics of the lungs, the lymphatics of the heart, and the lymphatics of the left superior extremity, and left side of the head.

The lymphatics of the pleura arrange themselves into anterior and posterior. The anterior * commence upon the thoracic aspect of the diaphragm, where they are joined by the lymphatics on the atlantal and sternal aspects of the integuments and muscles of the abdomen, which pierce the diaphragm at the ensiform cartilage; from this they ascend on each side of the sternum, in company with the internal mammary artery, those of the left side concentrating in one or two trunks, and continuing to ascend before or sternad to the left subclavian vein, where it joins

* Syn. Internal mammary lymphatics.

the thoracic duct, or terminates at once in the vein itself. In this course they are joined by lymphatic vessels between the intercostal spaces,* and run through several lymphatic glands in their course, especially those situated in the lower or sacral region of the neck. The lymphatics on the right side of the sternum take the same course, in company with the internal mammary artery of that side, and are joined by the intercostals of the same side; but they either terminate in the venous system, at the junction of the right internal jugular and right subclavian veins, or unite with the lymphatics of the right upper extremity and right side of the head.

The posterior set of lymphatics, marked with the digits 4 in Plate X., accompanies the intercostal arteries,† receiving, in its course towards the spinal column, several lymphatic vessels from the pleura, and intercostal muscles. They run between the ribs, and terminate in the thoracic duct, during its progress in the thoracic cavity, inosculating in their course with each other, especially around the aorta, with the lymphatics of the spinal canal, and running through several lymphatic glands, and also communicating with the lymphatic glands of the lungs.

The lymphatics of the lungs are arranged into superficial and deep-seated. The superficial set, marked 18 in *Fig.* 1 of Plate XI., originates on the pleura pulmonalis, and forms a complicated plexus, which runs between the lobes, inosculating with the deep set, and on the mesial aspect towards the bronchial glands, marked b. The deep-seated lymphatics derive their origin from the interlobular substance, where they inosculate with the superficial, and accompany the branches of the pulmo-

* Syn. Anterior intercostal lymphatics.

† Syn. Posterior intercostal lymphatics.

nary vessels, and the ramifications of the trachea, and run through the bronchial glands.* At the first division of the trachea K, the lymphatics of the left side, which are more numerous than those of the right, ascend along the left subclavian vein *v*, to the left internal jugular M, and either terminate in one of these veins, or in the thoracic duct, or in the lymphatic trunks of the left side of the neck or upper extremity. In this course these lymphatics are joined by those of the pericardium, and run through several lymphatic glands situated on the trachea.

The lymphatics of the right lungs, fewer in number than those of the left, after passing through the glands on the trachea, concentrate into one, which is joined by the lymphatics of the pericardium, anterior mediastinum, and heart, and ascend to terminate in the right internal jugular or subclavian vein.

The lymphatics of the pericardium are few, and run between the laminæ of the mediastinum to join those of the lungs. In the fetus, the lymphatics of the thymus gland have the same course and termination.

The lymphatics of the heart, marked with the digits 20 in Plate X., are divided into superficial and deep-seated. The superficial accompany the coronary arteries *r*, *s*, and in their progress are joined by the deep-seated lymphatics. Those which accompany the left coronary artery *s* are more numerous, and ascend on the aorta E, inosculating with those of the right side, and join the thoracic duct 1. The lymphatics accompanying the right coronary artery *r*, proceed to the pulmonary

* The bronchial glands, particularly those near the bifurcation of the trachea, are subject to scrofulous enlargement, to inflammation and suppuration, constituting phthisis pulmonalis, to calcareous concretions, to osseous depositions, and to scirrhus.

lymphatic trunk, which terminates in the right subclavian vein. In this course these lymphatics of the heart run through lymphatic glands situated on the aorta.

Besides the lymphatic glands already described in the thoracic cavity, there are some situated between the intercostal muscles; in the course of the internal mammary artery; between the laminæ of the anterior mediastinum; in the posterior cavity of the mediastinum; in the course of the œsophagus and aorta; and in the substance of the lungs, as described in page 9 of Part II.

The lymphatics of the upper extremity are arranged, like the preceding, into superficial and deep-seated. The superficial may be divided into the palmar and anconal. The anconal or posterior set commences on the back, or anconal aspect of the fingers, runs on their radial and ulnar margins, uniting in the course upwards or proximad along the cutaneous veins of the back of the hand, with the lymphatics on the palmar aspect. As they ascend proximad, they encircle the fore-arm on each side, and run on the palmar aspect at the bend of the arm, where they unite with the superficial palmar set. This latter set of lymphatics, marked with the digits 21, in *Fig.* 2 of Plate XI., begin on the palmar aspect of the fingers, run along the ulnar and radial margins, uniting with those on the anconal aspect, concentrate at the palm of the hand into three or four vessels, which continue to ascend proximad on the palmar aspect, several of them running on the cephalic r, and median s veins, to the bend of the arm, where they unite with the anconal set, run through the lymphatic glands in this region, marked 2, and then ascend chiefly in company with the brachial vein u, and artery h, to the axillary glands, marked with the digits 3. Some accompany the cephalic vein r throughout its course, to its termination

in the axillary vein *u*, and then join either the axillary 3, or the inferior cervical glands 4. From the axillary glands 3, the lymphatics, reduced in number to four or five, run along the subclavian vein *v*, and artery H, and either enter the subclavian vein, or join the lymphatics of the neck, or the thoracic duct 1.

The deep-seated lymphatics accompany the arterial distribution, beginning from the digital branches, and extending to the volar, the ulnar, the interosseal, the radial, the brachial, and the axillary arteries, and terminating in the axillary glands 3. In this course they inosculate frequently with the superficial, and receive the lymphatics 5 from the sternal aspect of the thorax, the mamma and the pectoral muscles. These latter lymphatics are marked 5 in *Fig.* 1 of Plate XI.

The superficial lymphatics from the sternal and lateral aspects of the thorax, originate as high up or atlantad as the sacral, or lower part of the neck, and as low down or sacrad as the umbilicus. The atlantal set runs along the greater pectoral muscle to the axillary glands; the sacral set ascends, and some of them pierce the rectus muscle, and join the lymphatics of the thorax. The lateral set ascends on the external oblique and serratus magnus muscles to the axillary glands, and some of them pierce these and the intercostal muscles, in order to join the intercostal lymphatics.

The lymphatics of the right upper extremity terminate either in the right subclavian vein, or in the internal jugular of the same side, and are frequently joined by the lymphatics of the right side of the head and those of the right lungs, so as to form a right thoracic duct. This, however, is of very short extent, being seldom more than an inch in length.

Besides the lymphatics of the upper extremity and

those of the mamma, joining the axillary glands, there are all the superficial lymphatics of the back, from the nape of the neck to the lumbar vertebræ. Those in the cervical region descend on the trapezius muscle, pierce the deltoid muscle, and join the axillary glands, receiving in their course the lymphatics of the shoulder. The lymphatics situated in the lumbar and dorsal regions ascend on the trapezius muscle, which they pierce to get to the axillary glands.

Besides the glands already described, there are generally from five to eight lymphatic glands (marked with the digits 22, in *Fig.* 1 of Plate XI.) situated in the course of the brachial artery. The lymphatic axillary glands 3 vary from eight to twelve in number, and are much larger than the preceding. They are closely connected by cellular substance with the axillary vein *u* and artery *h*, being plentifully supplied by their branches,* and they extend upwards or proximad beneath the pectoral muscles and clavicle to the inferior cervical glands 4.

The lymphatics of the head and neck are arranged also into superficial and deep-seated sets.

The superficial lymphatics of the head originate on the coronal aspect of the cranium, and accompany the frontal 91, the temporal *g*, and occipital *d* arteries, as delineated in Plate XII. Those marked 23, which accompany the frontal artery 91, with its vein *z*, descend to the inner angle of the orbit, where they accompany the facial artery *c*, with its vein z, to the base of the inferior maxillary bone, and unite with those which accompany the temporal artery. In this course they inosculate with the lym-

* As the axillary glands are very subject to inflammation, suppuration, scirrhus, and cancer, particularly when the last disease affects the mamma, the student should make himself thoroughly master of their situation and relative connexion.

phatics 24 of the temporal artery *g*, and are joined by several lymphatic vessels from the integuments of the face; they also run through or communicate with the lymphatic glands, marked 25, situated on the buccinator muscle, and those at the base of the lower jaw bone, marked with the digits 7.

The lymphatics marked 24, accompanying the temporal artery *g*, originate on the coronal aspect of the cranium, where they inosculate with those 23, which accompany the frontal 91, and the occipital *d* arteries, and then descend to the zygoma, where they communicate with some superficial lymphatic glands, marked 8, and afterwards accompany the artery to the angle of the inferior maxillary bone, where they unite with those of the face, the occiput, and nape of the neck, and join the superficial cervical glands, marked 9. From these glands, some of them descend on the external jugular vein *d*, and terminate in the inferior cervical glands, marked 4. Some of these lymphatics run superficially or dermad to the parotid gland s, where they inosculate freely with those of the face. The lymphatics of the occiput, marked 26, originate on the coronal aspect of the cranium, where they inosculate with those, 24, accompanying the temporal artery *g*, and descend behind the ear, in company with the occipital artery *d*, to the insertion of the sterno-cleido-mastoideus muscle E, where they leave the artery, running superficially to this muscle towards the lobe of the ear, where they join some of the superficial lymphatic glands of the neck, marked 10, and inosculate with the temporal lymphatics and those of the nape of the neck; some of them afterwards descend along the sterno-cleido-mastoideus muscle E, to its clavicular origin, where they terminate in the inferior cervical glands, marked 4.

The deep-seated lymphatics of the face derive their

origin from the muscles of the face, the nose, and the mouth, and descend to the deep superior cervical glands,* marked 6 in *Fig.* 1 of Plate XI., where they are joined by the lymphatics of the nares, the mouth, the tongue, the palate, the pharynx, and the larynx. The lymphatics of the nares accompany the internal maxillary artery to these lymphatic glands.† The deep-seated of the cranium, or rather those of the brain, have never been seen, but when this organ was in a diseased state, and effusion on its surface had taken place; in which case lymphatic vessels are seen on the dura mater, arachnoid coat, and pia mater; they accompany the primary divisions of the internal carotid and vertebral arteries (for no lymphatics have been discovered in the substance of the brain), back to their origin out of the cranium, where some of them terminate in the deep superior cervical glands 6, in *Fig.* 1 of Plate XI., or descend to the inferior cervical glands 4, inosculating on their emergence from the cranium with the superficial cranial and facial lymphatics. Some of these lymphatics accompany the internal jugular vein. The united lymphatics, from the surface of the head and its interior, descend along the internal jugular vein M, in *Fig.* 1 of Plate XI., and cellular web, covering the muscles posterior or dorsal to it, receiving in their course the lymphatics from the trachea K, the thyroid gland Z, the œsophagus, and muscles and integuments of the neck, and inosculating freely with each other, downwards to the inferior cervical glands 4, where they emerge in one or more trunks, which termi-

* Syn. Glandulæ jugulares: Glandulæ concatenatæ.

† The relative situation of these glands to the nerves and blood-vessels in this region should be thoroughly understood, as they are frequently the seat of operation, in consequence of becoming scirrhous and cancerous; they are also subject to inflammation, suppuration, and all the species of sarcoma.

nate either in the thoracic duct L, or in the internal jugular vein M, or in the subclavian vein N, but most frequently in the internal jugular vein. In many instances, these lymphatics of the head and neck unite immediately before their termination with those of the upper extremity, and even those from the lungs; on the right side this is almost invariably the case, as described in page 23.* Besides the lymphatic glands already enumerated, some are found behind or centrad of the parotid gland, others along the course of the common carotid artery, and internal jugular vein M, some of the latter of which are marked 11 in *Fig.* 1 of Plate XI.

The lymphatics of the lower extremities are divided into a superficial and deep set, like the rest of the system. The superficial lymphatics, marked with the digits 27, in *Figs.* 1 and 2 of Plate XIII., run between the integuments and the fascia lata K. They begin on the patellar aspect on each side of the toes, accompanying the branches of the saphena major vein, marked *b* in *Fig.* 2, along which they chiefly ascend on the leg to the tibial aspect of the knee joint, where they are joined by another set of lymphatic vessels, which originate from the outside or fibular aspect of the sole of the foot, and accompany the saphena minor vein upwards or proximad to the poples, where, as already observed, they join the preceding, or the deep lymphatics accompanying the popliteal artery. Both of these fasciculi of superficial lymphatic vessels frequently inosculate in their progress. In their course along the patellar aspect of the inner malleolus *s*, the

* The course of the lymphatic vessels to the glands should be understood, to enable us to comprehend how these glands in the neck become affected, when, for example, the disease is in the nose or mouth. The lymphatic glands in the region of the parotid and submaxillary glands are frequently first affected with disease, and afterwards involve these salivary glands.

first series of lymphatics, 27, is joined by some which originate on the sole of the foot. The lymphatic vessels formed by the union of these two fasciculi, ascend on the tibio-patellar aspect of the thigh, as represented in *Fig.* 2 of Plate XIII., where they still chiefly accompany the saphena major vein *b*, upwards or proximad to the inferior superficial lymphatic glands,* marked with the letters *a*. In this course along the thigh, these are joined by several lymphatics of the integuments from the outer or fibular, and the posterior or popliteal aspects; and throughout their whole extent, they frequently unite with the deep-seated.

The deep-seated lymphatics accompany the respective deep arteries of the leg, as the anterior tibial, the posterior tibial, and the fibular, uniting with each other at the poples, where they enter the popliteal lymphatic glands, and also inosculating frequently with the superficial lymphatic vessels. From their emergence at the popliteal glands, there are generally from four to six large trunks, which accompany the popliteal and superficial femoral arteries, upwards or proximad to the groin, where some of them join the inferior superficial inguinal glands, marked *a* in *Fig.* 1 of Plate XIII.; others join the deep-seated inguinal glands, marked 15 in Plate X.; while others again run by the side of these glands, receiving in their course those of the superficial lymphatic vessels which have emerged from the inferior superficial inguinal glands *a*, and enter the abdominal cavity with the crural artery t, T, and its vein U, and terminate in the external iliac glands 16. The other deep lymphatics of the thigh accom-

* It is this lower or distal series of lymphatic glands which becomes affected in the first instance, in wounds and diseases of the leg, distal to them, as, for example, in ulcers.

pany either the obturator artery, the ischiadic artery, or the gluteal artery, and join the sacral and hypogastric lymphatic glands. So also do the lymphatics of the perineum accompany the internal pudic artery, and join the hypogastric glands.

The superficial lymphatic vessels of the abdomen, beneath or sacrad to the umbilicus, marked 28, in the regions of the loins 30, the nates 31, the penis 32, the scrotum 33, and the perineum, inosculate frequently with each other, and ultimately join the superior superficial inguinal lymphatic glands, marked 17* in *Fig.* 1 of Plate XIII. From these superior glands 17, the lymphatic vessels, reduced in number, descend to the inferior inguinal glands *a*. The superficial lymphatic vessels of the inferior half of the abdomen inosculate with those of the superior half, where they originate or commence. The superficial lymphatics of the penis and scrotum often inosculate with the superficial lymphatics of the thigh, as seen in *Fig.* 1 of Plate XIII. Those of the penis, marked 32 in *Fig.* 1 of Plate XIII., are generally three in number, and begin at the prepuce, from which they extend to the root of the member, inosculating with each other, and ultimately separating into two sets, one of which runs to the glands on the one side, and the other set to the series of glands on the opposite side. The lymphatics of the scrotum 33, inosculate with those of the testis b. Those of the clitoris and external labia in the female also inosculate with those of the thigh, and terminate in the superior superficial lymphatic glands.†

* It is these superior inguinal lymphatic glands which become affected with bubo, supervening to gonorrhœa, or syphilitic ulcer, on the glans, prepuce, or scrotum.

† This chain of connexion should be kept in view in syphilitic chancres occurring in the female.

The deep lymphatic vessels of the penis accompany the internal pudic artery to the hypogastric glands. The deep lymphatic vessels of the clitoris take the same course. The lymphatics of the lower portion of the vagina ascend to the external aperture of the inguinal canal, enter the abdominal cavity, and run along the round ligaments to the uterus, where they join the lymphatics of that organ. Besides the lymphatic glands of the lower extremity, already described, there are some others. One or two is occasionally found in the course of the anterior tibial artery, near the knee joint, and is named glandula tibialis antica. The popliteal glands are small, commonly about three in number, and are in close contact with the popliteal blood-vessels.

In the pelvis a number of lymphatic vessels originates from the viscera in this cavity; in the male, from the urinary bladder, the prostate gland, and vesiculæ seminales; and in the female, from the urinary bladder, uterus, and its appendages. In the male, those of the bladder, prostate gland, and vesiculæ seminales, inosculate with each other, and ascend to enter the external iliac 16, the hypogastric, or internal iliac 19, and sacral lymphatic glands. In the female, those of the bladder take the same course. Those of the vagina, and os et cervix uteri, accompany the uterine arteries to the hypogastric glands; those of the body and fundus of the uterus accompany the spermatic arteries, being joined in their course by the lymphatics of the ovaria, and enter the lumbar glands. The lymphatics of the ureters partly join those of the urinary bladder, and partly ascend along the ureters, to enter the lumbar glands, inosculating with the lymphatics of the kidneys. Independently of these in the cavity of the pelvis, there are several lymphatic vessels around its parietes; thus, some originate from the central aspect of the sym-

physis pubis, where they are joined by lymphatics of the pyramidalis and levator ani muscles, and proceed to join the external and internal iliac glands; while others derive their origin from the concave aspect of the sacrum and coccyx, from the sacro-ischiadic plexus of nerves, where they are joined by those which accompanied the gluteal, ischiadic, and internal pudic arteries from without the pelvis, and terminate in the hypogastric glands.

The lymphatics of the testicle, marked 34 in Plate X., are exceedingly numerous, and consist of a superficial and deep set, the former deriving its origin from the tunica vaginalis, and the latter from the substance of the gland r, *r*. From this they ascend in company with the spermatic artery *g* to the inguinal canal, enter the abdominal cavity, and extend along the artery to the lumbar glands, where they inosculate with the renal lymphatics. At their origin they are joined by some of the lymphatics of the scrotum.

The external iliac glands, about eight or ten in number, extend along the course of the artery of the same name; and the internal iliac or hypogastric glands, about twelve in number, also extend along their artery. The sacral glands, small and numerous, extend between the hypogastric glands of each side, being situated between the rectum and the sacrum, and mingling with the mesocolic glands. The lumbar glands, extremely numerous and large, are situated around the vena cava ascendens, and abdominal aorta, from its bifurcation into the two common iliacs upwards or atlantad to the renal arteries, on the latter of which they extend laterad, and also on the sides of the bodies, and transverse processes of the lumbar vertebræ.

The lymphatics of the kidneys consist of a superficial and deep set, the former run over the surface, inosculat-

ing with the lymphatics of the supra-renal glands, onwards or mesiad to the concave fissure of the kidney, where they join the deep-seated lymphatics which come from the substance of the gland. From the concave fissure both of these lymphatics accompany the renal arteries, inosculating with those of the ureters and spermatic cord, and terminate either in the lumbar glands, or the thoracic duct itself.

The lymphatics of the supra-renal glands join either those of the kidney, or the liver, or the spleen, according to the side of the body to which they belong.

The lymphatics of the peritoneum and muscles, forming the parietes of the abdomen, accompany those arteries which are in their vicinity; thus, for example, those on the sternal aspect accompany the epigastric artery to its origin, and terminate in the external iliac glands. Those on the lateral aspect, accompany the lumbar and the circumflex iliac arteries, the former joining the lumbar glands, where they generally run across to the lymphatics of the opposite side, to form the lumbar plexus. Those which accompany the circumflex iliac artery terminate in the external iliac glands.

The lymphatic vessels which have been described entering the lumbar glands, emerge from these in one or two trunks; that on the right side emerges and ascends dextrad of the aorta, to the right renal artery, a little atlantad to which it unites with that of the left side, which crosses from left to right, behind or sacrad to the aorta, and here both are joined by the concentrated lymphatic vessel from the intestines, which descends dextrad of the origin of the superior mesenteric artery and the aorta, to form the thoracic duct described in page 18.

Sr. Lippi of Florence has traced some lymphatic vessels from the lumbar glands, entering the vena cava as-

cendens, near the third lumbar vertebræ. He has also discovered other lymphatics at once entering the venous system, as for example, the lymphatics of the liver joining the vena portæ. In one of his experiments, having inserted a pipe in one of the left external iliac lymphatic vessels, and injected mercury, he perceived in the left lumbar region several lymphatic vessels enter the vena cava ascendens, some running sternad, others dorsad, of the aorta; also some ascending and joining the superior mesenteric and splenic veins. In another experiment, he found some lymphatic vessels at once enter the common iliac vein.

The structure of a lymphatic vessel is somewhat similar to that of a vein; only it has no distinctly visible muscular fibres, even in the largest trunk, the thoracic duct. It is presumptive, however, that it possesses either these fibres or others analogous, as it evidences sensibility and motion in its living action. The external tunic is partly fibrous.* The parietes of a lymphatic vessel are exceedingly thin, and consist of a distinct fibro-cellular and a serous tunic, both of which are very extensible, and the external possesses considerable strength. Throughout the system of lymphatic vessels, a number of valves are situated, which are reflections of the internal serous tunic, and are much less numerous in the thoracic duct than in the smaller branches. These valves are of a semilunar or parabolic figure, the convexity towards their origin, their concavity towards the venous system; they are generally arranged two and two, the one being a little larger than the other; sometimes there is only one, while at others there are three; the latter,

* Sœmmerring and Schreger have seen transverse muscular fibres in the thoracic duct of man and the calf.

however, is very rarely the case. The lymphatics have minute nerves, and vasa vasorum distributed on them.*

The lymphatic glands, which we have seen to be in general small, hard, roundish, and in some degree flattened bodies, are of the conglobate class, and of a reddish-grey colour. Their size and colour vary in different parts of the body; they are smallest on the serous membranes, and largest in the axillæ, at the root of the lungs, mesentery, pelvis, and groins; but the largest and smallest are found together in these regions. The smallest are clear, as those on the pleura and peritoneum; the subcutaneous are of the reddish-grey colour, while those at the root of the lungs and trachea are almost black. They also vary in size at the different periods of life; they are larger in early than in advanced age, and greater in size in the female than in the male.

They are enveloped in a condensed cellular tissue, and free from the contiguous structures; they seem on first aspect to be homogeneous, but when they are filled with air or mercury, they become knotted on their external surface; and in their interior, the lymphatic vessels which enter them, divide into a multitude of very delicate ramifications, accompanied with equally delicate arteries, veins, and nerves, the latter consisting of excessive tenuity, all connected together by a delicate cellular tissue. The arteries are extremely numerous. The lymphatic vessels which enter the lymphatic glands, are more numerous than those which emerge to proceed onwards to the thoracic duct. In the fetus no lymphatic glands exist, and there are in their stead merely simple plates, where the continuity of lymphatic vessels is quite apparent.

* The lymphatic vessels are exceedingly subject to inflammation and suppuration.

INDEX

OF

THE LETTERS OF REFERENCE

IN

PART XII.

GRAVID UTERUS, AND LYMPHATICS.

PLATE VII.

A, Mons veneris
E, Cervix uteri
K, Body of uterus
L, Ileum
M, Caput cœcum coli
N, Ovarium
O, Ascending portion of colon
P, Transverse arch of colon
S, Corpus fimbriatum
h, Omentum majus
k, Fundus uteri

a, Peritoneum, investing flaps of abdominal parietes
*k**, Fallopian tube
*k***, Ovarian aperture of Fallopian tube
z, Sigmoid flexure of colon

PLATE VIII.

A, Mons veneris
E, Cervix uteri
K, Body of uterus
L, Ileum

PLATE VIII. *(Continued.)*

M, Caput cœcum coli
N, Ovarium
O, Ascending portion of colon
P, Transverse portion of colon
S, Corpus fimbriatum

g, Umbilical vein
h, Omentum majus

a, Peritoneum investing flaps of abdominal parietes

b, Section of uterus
c, Amnion
d, Chorion
f, Decidua
*k**, Fallopian tube
*k***, Ovarian aperture of Fallopian tube
n, Umbilical artery
p, Placenta
z, Sigmoid flexure of colon

PLATE IX. *Fig.* 1.

g, Umbilical vein

c, Amnion

d, Chorion
f, Decidua
p, Placenta

Fig. 2.—An Ovum, 20 days old, laid open.

c, Amnion

d, Chorion.

Fig. 3.—An Ovum, 40 days old.

d, Chorion.

Fig. 4.—An Ovum, 40 days old, laid open.

c, Amnion
d, Chorion

e, Fetus
h, Vesicula umbilicalis

Fig. 5.—A Fetus, 50 days old.

h, Vesicula umbilicalis.

Fig. 6.—A Fetus, 60 days old.

u, Umbilical cord.

Fig. 7.—An Ovum, 60 days old.

d, Chorion.

Fig. 8.—An Ovum, 60 days old.

d, Chorion.

Fig. 9.—An Ovum, 90 days old.

g, Umbilical vein
c, Amnion
d, Chorion
f, Decidua

PLATE X.

A, Ribs
A*, Suspensory ligament of liver
D, Right ventricle of heart
E, Aorta
F, Pulmonary artery
H, Left subclavian artery
I, Right lobe of liver
I*, Rectum
K, Jejunum
L, Ileum
M, Left internal jugular vein
M*, Caput cœcum coli
O, Ascending portion of colon
P, Transverse arch of colon
P*, Left carotid artery
Q, Arteria innominata
R, Superior mesenteric artery
T, External iliac artery
U, Femoral vein
X, Penis

d, Right auricle of heart
e, Gall bladder
f, Left branch of pulmonary artery
g, Left ventricle of heart
i, Left lobe of liver
r, Testis
t, Superficial femoral artery

d, Left auricle of heart
g, Spermatic artery
h, Vena cava descendens
r, Right coronary artery
r, Epididymis
s, Left coronary artery
v, Left subclavian vein
z, Sigmoid flexure of colon

1, Thoracic duct
2, Mesocolic glands
3, Mesenteric glands
4, Intercostal lymphatics
12, Lacteals of the jejunum and ileum
13, Lacteals of the colon
14, Lymphatics of the liver
15, Deep-seated inguinal glands
16, External iliac glands
19, Internal iliac or hypogastric glands
20, Lymphatics of the heart
29, Appendix vermiformis
34, Lymphatics of the testis

PLATE XI. *Fig.* 1.

A, Ribs
A*, Clavicle
E, Deltoid muscle
G, Lungs
K, Trachea
M, Internal jugular vein
P, Left carotid artery

b, Bronchial glands
h, Brachial artery
k, Bronchus
q, Basilic vein
r, Cephalic vein
s, Parotid gland
s*, Median vein
u, Brachial vein

Z, Thyroid gland

h, Vena cava descendens
u, Axillary vein
v, Subclavian vein

1, Thoracic duct
2, Lymphatic glands at elbow joint
3, Axillary glands
4, Deep inferior cervical lymphatic glands
5, Truncated pectoral lymphatics
6, Deep superior cervical lymphatic glands
7, Lymphatic glands at base of inferior maxilla
10, Superficial lymphatic glands behind the ear
11, Lymphatic glands accompanying the internal jugular vein
18, Lymphatics of lungs
21, Lymphatics of fore-arm
22, Brachial lymphatic glands

Fig. 2.

v, Fascia palmaris

q, Basilic vein
r, Cephalic vein

s, Median vein

2, Lymphatic glands at elbo-- joint

PLATE XII.

A, Clavicle
B, Lateral nasal cartilage
C, Sterno-hyoideus muscle
D, External jugular vein
E, Sterno - cleido - mastoideus muscle
G, External carotid artery
U, Sterno-thyroideus muscle

a, Zygomaticus major muscle
b, Depressor anguli oris muscle
e, Zygomaticus minor muscle
f, Orbicularis oris muscle
i, Levator labii superioris alæque nasi muscle
l, Masseter muscle
n, Compressor naris muscle
q, Occipito-frontalis muscle
r, Attollens aurem muscle
s, Parotid gland
w, Orbicularis palpebrarum muscle
y, Temporal vein
z, Facial vein

c, Facial artery

d, Occipital artery
g, Temporal artery
m, Mylo-hyoideus muscle
w, Anterior belly of digastric muscle
z, Frontal vein

4, Inferior cervical lymphatic glands
7, Lymphatic glands at the base of inferior maxilla
8, Temporal lymphatic glands
9, Superficial cervical lymphatic glands
10, Superficial lymphatic glands behind the ear
23, Facial lymphatics
24, Temporal lymphatics
25, Lymphatic glands on buccinator muscle
26, Occipital lymphatics
70, Depressor labii inferioris muscle
90, Occipital vein
91, Frontal artery

PLATE XIII. *Fig.* 1.

K, Fascia lata
z, Scrotum

b, Tunica vaginalis testis

PLATE XIII. *Fig.* 1. *(Continued.)*

[illegible], Inferior superficial inguinal glands

b, Saphena major vein

17, Superior superficial inguinal glands

27, Superficial lymphatics of the thigh

28, Superficial lymphatics of abdomen

30, Superficial lymphatics of the loins

31, Superficial lymphatics of the nates

32, Superficial lymphatics of the penis

33, Superficial lymphatics of the scrotum

Fig. 2.

K, Fascia lata

b, Vena saphena major

s, Malleolus internus

27, Superficial lymphatics of the leg